

**SHEAR AND WATER RESISTANT  
FELT PAD FOR FURNITURE LEGS**

**FIELD OF THE INVENTION**

This invention relates to the field of pads to be used underneath the legs  
5 of furniture to protect floors from scratches caused by the movement of  
furniture. Most particularly, this invention relates to replaceable pads and  
shear resistant pads designed to last longer.

**DESCRIPTION OF PRIOR ART**

The use of felt pads for protecting floors is common and widely used.  
10 However, many of such pads are installed to the bottom of the legs of  
furniture using a double-sided adhesive tape, further, such pads have a  
weakness toward shear constraints where they tend to tear. The following  
Patents and Patent Applications Publications illustrate such concepts.

**US 10/152,660 Hanes**; A replaceable protection system where the adhesive  
15 used is a double sided adhesive tape, and wherein a plurality of loops are  
incorporated to the felt material in order to be fixed to a velcro consisting  
of hook shaped members.

**CA 2029911 Dumas 1992/05/15** ; A floor protector made to be inserted in  
hollow furniture legs.

20 **CA 2351594 Allan 1999/11/17** ; A floor protector made of a hardened  
material such as plastic, which is screwed under the legs of the piece of  
furniture.

**BACKGROUND OF THE INVENTION**

A general objective of the invention is to provide a pad for application  
25 under the leg of a piece of furniture in order to protect the floor from  
scratches that may be caused by the displacement of this furniture.  
Specifically, we wanted the pad to be adaptable to different sizes of

furniture legs which possess a flat surface underneath, in contact with the floor. The prior art comprises of many ways to achieve these goals. However, the main problems with the existing pads is their lack of resistance to shear efforts, lack of durability and poor resistance to the application of water such as when cleaning the floors. The inventors found a way to provide a pad that is further resistant in the three manners explained. In this way we produced a felt pad with a hardened upper layer in which an adhesive film is infused to a uniform upper surface.

Further, we realized as in Hanes (10/152,660) that once one achieves good durability another problem soon comes up : if the material that constitutes the pad becomes contaminated with external particles, these particles eventually build up and may become a cause for scratches to the floors. In this case, it is usually advantageous to change the soft pad for a new one. If the adhesive substance used to secure the pad to the bottom of the furniture leg provides the shear resistance needed, it is often hard to remove and tends to leave a persisting film on the bottom of the leg. The operation of changing the pad henceforth becomes an unpleasant burden.

As in Hanes, we decided to offer a means to install a base to which may be installed an interchangeable pad. Our base consists of a shear resistant mushroom shaped velcro to which the adhesive is infused to the back face to provide a uniformly smooth adhesive surface. Further, the improved pad consists of two soft sides with a reinforced middle section providing a shear resistant pad.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate an embodiment of the invention.

FIG.1a is a perspective view of the pad seen from the top;

FIG.1b is a perspective of the pad of FIG.1a seen from the bottom.

FIG.2a is an alternative to the pad of FIG.1b, seen from the bottom.

FIG.2b is a detailed view of the pad of FIG.2a seen from the top.

FIG.2c is an enlarged view of the pad of FIG.2b once assembled.

FIG.3a shows a front view of the prior art.

5 FIG.3b shows a front view of the pad of FIG. 2a.

#### DETAILED DESCRIPTION OF THE DRAWINGS

In the following description the bold numbers refer to items illustrated in the drawings.

Note : FIGS.1 et 2 both show a pad having an adhesive incorporated side  
10 and another side which is soft and can slide on a surface without  
damaging it. FIGS.3a and b illustrate the differences between the present  
innovation and the prior art.

FIG.1a shows a permanent protector pad **20** which may be built with an  
inferior surface **22** made of soft material, and a reinforced upper section  
15 **24**, preferably reinforced by the infusion of a resin in the fibrous material  
of the pad. The upper section comprises an adhesive upper surface **26**,  
wherein the adhesive is preferably incorporated by injection in the upper  
surface of the superior section of the pad, in the reinforced material, in a  
way to provide an even upper adhesive surface. In FIG.1a the pad is  
20 shown viewed slightly from the top whereas in FIG.1b the pad is shown  
viewed slightly from the bottom.

FIG.1b also shows the general shape of the bottom of the leg **28** of a piece  
of furniture underneath which may be installed the pad.

FIG.2a shows a perspective view of a replaceable protector pad **30** shown  
25 slightly from the bottom and composed of two pieces : a fixed base **32** and  
a replaceable sole **34**.

FIG.2b shows a perspective viewed slightly from the top where one can

see two enlarged windows showing the material of the sole and the material of the base. In the main view, one can see that the base is made of a fabric 38 underneath which is a grabbing material 36 and on top of which is incorporated an adhesive substance in a way to provide an even  
5 upper adhesive surface 39. The grabbing material consists of a mushroom-like 40 velcro type material consisting of many mushroom-like grabbing members.

The sole 34 is made of three sections : a superior section 42 made of a material comprising fibers 44 forming arches which will be restrained by  
10 the mushroom-like members in a way that the sole may be fixed upon the base. The sole also comprises a bottom section 46 made of a soft material that may slide without damaging floor surfaces. The sole also comprises a middle section 48 which is made of a firm material. This way the complete sole is much more resistant to shear stress constraints. Typically, in the  
15 bottom and top sections felt may be used as material. It is also possible to build the sole material by joining two sheets of felt using a heat process at the surfaces which are in contact. In this way, the center material melts and then hardens, constituting the firmer center section material. In production both sheets of felt are unrolled and approach each other  
20 gradually. At the moment of junction, a flame causes the fibers at the surface of the contact surfaces to melt and join, and then harden. This type of felt has a better shear resistance than the original material, and gives a stronger resistance to the entire assembly. This is very important for a long lasting protector pad.

25 FIG.2c shows an enlarged view of the side of the sole fixed to the base. The mushroom-like grabbing members restrain the fibers of the soft upper section from being removed, especially during shear stress. The sole fixed

in this way is particularly resistant to shear constraints, however, a relatively light constraint in the tension direction permits the removal of the sole for replacement after normal wear.

FIG.3a shows the pad of the prior art 50 which is made of three parts : a  
5 fibrous pad 52 reinforced with stronger fibers 54, a hook material with a grabbing inferior section 56 comprising hooks members 58, an irregular uneven superior fabric surface 57 and a double sided adhesive tape 60.

We found the problem with this construction is that the adhesive tape is only in contact with a fraction of the upper surface because this surface is  
10 irregular. Since it is embossed, only the fraction of the surface which is elevated keeps contact with the tape. Furthermore, since the upper surface of the protector pad is porous, water, soap and humidity may infiltrate and attack the adhesive tape when the pad is exposed to such elements in events such as mopping of the floors. The adhesive tape is very weak  
15 against water and has a tendency to lose its adhesion either to the pad or to the underneath of the furniture legs as soon as it is moistened. This may lead to the loss of the protective pad and to floor damage when the loss goes unnoticed. This is why a strong, durable and water-resistant adhesion is not only important to protect floors, but critical.

20 The felt may break down in layers or by pieces. In order to reinforce the felt sole in the prior art model, stronger fibers 54 are added to the typical felt material 52. These stronger reinforcing fibers are firmer than felt and therefore may damage the floor surface noticeably if it is slid repeatedly. It will not damage the surface as the furniture legs might but  
25 may however produce a long term sanding effect. This is why we found it is imperative to provide a lower surface made entirely of soft material.

FIG.3b shows an application of the present invention : the fact of

reinforcing the sole only at its center 48 leaves pure material to slide on the surfaces without damage while keeping an increased overall shear strength. This also permits the upper surface material 42 to be grabbed by the mushroom-shaped grabbing members 36. The incorporation of the adhesive is achieved in the fabric of the base, it makes the superior surface even so the entire surface is exposed to adhesion to the furniture leg. This also reduces the quantity of pores in the material, and therefore limits the infiltration of water. Furthermore, the use of mushroom-shaped grabbing members instead of the hook-shaped ones gives a great increase in shear effort resistance. Overall, this protector pad is much stronger against shear efforts and against humidity and water.

#### RAMIFICATIONS

During experimentation, the inventors have been confronted to several problems : first of all, the protector pad needed to be resistant to shear strength. Many prior art pads were installed under furniture legs using a double sided adhesive tape. The problem with this installation was that the tape did not adhere well to the fibrous matter of a felt pad. For example, imagine installing tape on a carpet, only the fibers are in contact with the tape and these fibers account only for a relatively small fraction of the carpet total surface area. This has two consequences :

- The first one is the lack of resistance to shear efforts : the protector pad installed in this way has a tendency to leave the bottom of the furniture leg which sometimes causes many scratches to the floor before we realize it left. Furthermore, the porous material was very weak against water, which makes its way through the pad to attack the adhesive tape. The adhesive tape loses most of its adhesive qualities when wet.

• The second consequence is that when distributed, this adhesive tape is often installed to the pad and covered by a protector layer. Once in a while, when trying to remove the protector layer we actually removed the adhesive tape from the pad or even a layer of felt. This left the pad unusable.

Another problem often encountered with prior art is that a soft material like felt (which is often used) usually does not offer a very good resistance to shear strength. The material itself often had a tendency to break down by layers or otherwise deform, especially when moving heavy furniture over uneven floors. This is a cause for premature wear of the protector pad.

We found a way to overcome these problems : we inject a material which hardens in the superior section of the pad. This makes the pad much stronger to shear efforts and less vulnerable to wear while permitting the pad to conserve its softness on the lower section.

An adhesive is then injected on the superior surface which is now incorporated with a hardened material (latex for example) which gives it a surface which is much less porous. Since the surface is also more straight and even, the adhesive is now secured to a strong base and is in contact with the entire surface area of the pad. All the problems which were referred to earlier are solved with this procedure. The water has much more trouble making its way to the adhesive; the protector layer covering the adhesive when distributed will be easy to remove and the adhesive bond holding the pad to the bottom of a furniture leg is now very strong.

So strong in fact that it became difficult to replace the pad after the soft material of the pad came into contact with impurities. This is where we had another idea : make the pad replaceable. Velcro was a good candidate

because it already attached itself very well to a material such as felt. Therefore, several experiments were made and it was found that the best type of velcro to be used was the one in which the grabbing material had a head in the shape of a mushroom instead of the one in which the shape was simply the one of a hook. The mushroom shapes offer a form of hook  
5 which is equally strong all around, on 360 degrees. They tend to grab more than one fiber at a time. Hence, they are resistant to shear effort applied in any direction and stay easy to change when an effort is applied in tension. To give an idea of the strength, the following experience was  
10 realized :

A piece of velcro material having the approximate dimensions of one inch wide and where one inch long was installed on a felt surface and where the rest exceeded the felt material as to provide a gripping surface was pulled sideways by an average male adult.  
15 When done using a velcro material with hook shaped members, a strong pull was sufficient to remove the velcro strap from the felt material. However, when using a velcro material with mushroom shaped members, even a strong pull from an average male adult was not sufficient to release the strap from the felt.

20 To keep the good qualities achieved with the one-piece protector pad, a few transformations followed. The adhesive is now directly injected to the porous surface of the back face of the velcro grabbing material in a way to form an even adhesive film surface to the face which will be installed to the bottom of the furniture legs. Secondly, the center of the felt pad is  
25 now reinforced instead of the superior section in order to leave an upper surface which may be grabbed by the velcro members, and a lower surface which is soft and delicate to protect the finish of the floors from

scratches. An inexpensive way to achieve this center reinforcement is to use a heating process to join two sheets of felt material by surfaces which are put into contact. Since only the bottom of the upper sheet and the top of the bottom sheet are melted and joined by the heat process, the top and bottom sections of the resulting material keep the desired characteristics. Presently, we use a polyester felt in the fabrication of our preferred protector pads. However, the use of a felt made from natural materials is presently investigated to provide an earth-friendly biodegradable product. Other materials may also prove to be advantageous to use in certain applications.

It is to be clearly understood that the instant description with reference to the annexed drawings is made in an indicative manner and that the preferred embodiment described herein is meant in no way to limit further embodiments realizable within the scope of the invention. The matter with is claimed as being inventive and new is limited only by the following claims.

## PARTS LIST

- 20- Permanent protector pad
- 22- Soft inferior surface
- 24- Reinforced upper layer
- 5 26- Adhesive superior surface
- 28- Furniture leg
- 30- Replaceable protector pad
- 32- Fixed base
- 34- Replaceable sole
- 10 36- Grabbing material
- 38- Upper material with adhesive
- 39- Uniform adhesive surface
- 40- Grabbing mushrooms
- 42- Upper layer
- 15 43- Upper felt sheet
- 44- Fibers forming arches
- 45- Lower felt sheet
- 46- Lower layer
- 48- Central layer
- 20 50- Prior art
- 52- Felt
- 54- Strong fibers
- 55- Grabbing fabric
- 56- Grabbing surface
- 25 57- Uneven upper face
- 58- Hooks
- 60- Double sided adhesive tape
- 62- Furniture leg